



Anti-correlation between gas flux and volcanic tremor on Stromboli volcano

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Recent developments in both in-situ and remote sensing volcanic gas monitoring methods have allowed systematic monitoring of volcanic CO₂ fluxes for the first time. This important development allows us to probe ever deeper into magma feeding systems, due to the very early exsolution of CO₂ from melts. Such data have already shown precursory anomalies prior to larger than normal explosions on Stromboli, but they also allow us to examine the relationship between volcanic degassing and geophysical parameters such as volcanic tremor. Such combined studies have in the past focussed on the more readily available data provided for SO₂ flux, but this has the limitation of being a relatively minor component of the total gas release, which is dominated by H₂O and CO₂. In general it is believed that tremor and degassing are somewhat coupled, but the exact nature of the relationship between the two parameters as well as the source mechanism for tremor are poorly understood. Here we present CO₂ and SO₂ gas flux data together with volcanic tremor data collected on Stromboli volcano in 2008. We show that, contrary to expectations, there is an inverse relationship between CO₂ flux and tremor, with tremor decreasing when CO₂ flux increases. The implications of this new observation are discussed and novel processes which may explain this behaviour are proposed.